

The image displays a grid of binary digits (0s and 1s) arranged in a pattern that tapers to the right. The grid is composed of four distinct vertical columns. The first column on the left contains 15 rows of 'F' characters, representing binary 0s. The second column contains 15 rows of '1' characters, representing binary 1s. The third column contains 15 rows of '1' characters, also representing binary 1s. The fourth column on the right contains 15 rows of 'X' characters, representing binary 1s. The pattern creates a visual effect where the density of binary 1s decreases from left to right, tapering off towards the right edge of the grid.

The diagram illustrates a sequence of binary strings arranged in three columns. The first column contains strings of length 1 to 10, starting with 'L' and ending with 'LLLLLLLLLL'. The second column contains strings of length 1 to 10, starting with 'I' and ending with 'IIIIIIIIII'. The third column contains strings of length 1 to 10, starting with 'S' and ending with 'SSSSSSSSSS'.

```
1 0001 0 MODULE MAKPTR (
2 0002 0   LANGUAGE (BLISS32),
3 0003 0   IDENT = 'V04-000'
4 0004 0   ) =
5 0005 1 BEGIN
6 0006 1
7 0007 1
8 0008 1 ****
9 0009 1 *
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26 0026 1 * SOFTWARE ON EQUIPMENT WHICH IS NOT SUPPLIED BY DIGITAL.
27 0027 1 *
28 0028 1 *
29 0029 1 ****
30 0030 1
31 0031 1 ++
32 0032 1
33 0033 1 FACILITY: F11ACP Structure Level 2
34 0034 1
35 0035 1 ABSTRACT:
36 0036 1
37 0037 1 This routine constructs retrieval pointer in the file header map area
38 0038 1 for the indicated blocks.
39 0039 1
40 0040 1 ENVIRONMENT:
41 0041 1
42 0042 1 STARLET operating system, including privileged system services
43 0043 1 and internal exec routines.
44 0044 1
45 0045 1 --
46 0046 1
47 0047 1
48 0048 1 AUTHOR: Andrew C. Goldstein, CREATION DATE: 14-Dec-1977 17:13
49 0049 1
50 0050 1 MODIFIED BY:
51 0051 1
52 0052 1 B0103 ACG0122 Andrew C. Goldstein, 17-Jan-1980 15:54
53 0053 1 Get bug check codes up to date
54 0054 1
55 0055 1 B0102 ACG0096 Andrew C. Goldstein, 18-Dec-1979 18:59
56 0056 1 Add zero count bug trap
57 0057 1
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: 58      0058 1 :     B0101 ACG0008      Andrew C. Goldstein, 28-Dec-1978 19:27
: 59      0059 1 :     Add placement control support
: 60      0060 1 :
: 61      0061 1 :     B0100 ACG00001     Andrew C. Goldstein, 10-Oct-1978 20:00
: 62      0062 1 :     Previous revision history moved to [F11B.SRC]F11B.REV
: 63      0063 1 !..
: 64      0064 1 :
: 65      0065 1 :
: 66      0066 1 LIBRARY 'SYSSLIBRARY:LIB:L32';
: 67      0067 1 REQUIRE 'SRC8:FCPDEF.B32';
: 68      1058 1 :
: 69      1059 1 LINKAGE
: 70      1060 1     L_MAKE_POINTER = CALL :
: 71      1061 1           GLOBAL (MAP_POINTER = 9).
: 72      1062 1 :
: 73      1063 1     L_CHECK_POINTER = CALL :
: 74      1064 1           GLOBAL (HEADER = 8);
: 75      1065 1 :
: 76      1066 1 FORWARD ROUTINE
: 77      1067 1     MAKE_POINTER    : L_MAKE_POINTER,      ! build map pointer
: 78      1068 1     CHECK_POINTER   : L_CHECK_POINTER;    ! check if pointer will fit
```

: R

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: 80      1069 1 GLOBAL ROUTINE MAKE_POINTER (COUNT, LBN, FILE_HEADER, PLACEMENT_CODE) : L_MAKE_POINTER =
: 81      1070 1
: 82      1071 1    ++
: 83      1072 1
: 84      1073 1    FUNCTIONAL DESCRIPTION:
: 85      1074 1
: 86      1075 1    This routine constructs retrieval pointer in the file header map area
: 87      1076 1    for the indicated blocks.
: 88      1077 1
: 89      1078 1
: 90      1079 1    CALLING SEQUENCE:
: 91      1080 1    MAKE_POINTER (ARG1, ARG2, ARG3, ARG4)
: 92      1081 1
: 93      1082 1    INPUT PARAMETERS:
: 94      1083 1    ARG1: block count
: 95      1084 1    ARG2: start LBN
: 96      1085 1    ARG3: address of file header
: 97      1086 1    ARG4: if present, placement data to record or 0
: 98      1087 1
: 99      1088 1    IMPLICIT INPUTS:
:100      1089 1    R9 = address to receive pointer
:101      1090 1
:102      1091 1    OUTPUT PARAMETERS:
:103      1092 1    NONE
:104      1093 1
:105      1094 1    IMPLICIT OUTPUTS:
:106      1095 1    R9 = address past pointer
:107      1096 1
:108      1097 1    ROUTINE VALUE:
:109      1098 1    1 if OK
:110      1099 1    0 if pointer won't fit
:111      1100 1
:112      1101 1    SIDE EFFECTS:
:113      1102 1    pointer added to header map area
:114      1103 1
:115      1104 1    --
:116      1105 1
:117      1106 2 BEGIN
:118
:119      1108 2 EXTERNAL REGISTER
:120      1109 2    MAP_POINTER      = 9 : REF BBLOCK; ! pointer to map area
:121
:122      1111 2 MAP
:123      1112 2    FILE_HEADER     : REF BBLOCK; ! buffer containing file header
:124
:125      1114 2 GLOBAL REGISTER
:126      1115 2    HEADER          = 8 : REF BBLOCK; ! local pointer to file header
:127
:128      1117 2 LOCAL
:129      1118 2    PLACEMENT_
:130      1119 2    POINTER_SIZE;           ! copy of placement data
:131
:132      1120 2    ! size needed for map pointer
:133
:134      1122 2    ! Check the specified count; it must not be zero.
:135
:136      1123 2    !
:137      1124 2 IF .COUNT EQL 0
```

```
137 1126 2 THEN BUG_CHECK (MAPCNTZER, FATAL, 'Attempted to generate zero length map pointer');
138 1127 2 ! See if placement is specified.
139 1128 2 !
140 1129 2 PLACEMENT = 0;
141 1130 2 POINTER_SIZE = 2;
142 1131 2 IF ACTUALCOUNT GEQU 4
143 1132 2 THEN
144 1133 2 BEGIN
145 1134 2 PLACEMENT = .PLACEMENT_CODE;
146 1135 2 IF .PLACEMENT NEQ 0
147 1136 2 THEN POINTER_SIZE = .POINTER_SIZE + 1;
148 1137 2 END;
149 1138 2
150 1139 2
151 1140 2 ! Get the address of the file header for the check routine.
152 1141 2 ! Then determine the format of the pointer and build it.
153 1142 2 !
154 1143 2
155 1144 2 HEADER = .FILE_HEADER.
156 1145 2
157 1146 2 IF .COUNT LEQU 256 AND .LBN LSSU 1^22
158 1147 2 THEN
159 1148 3 BEGIN
160 1149 3 IF NOT CHECK_POINTER (.POINTER_SIZE) THEN RETURN 0;
161 1150 3 IF .PLACEMENT NEQ 0
162 1151 3 THEN
163 1152 4 BEGIN
164 1153 4 (.MAP_POINTER)<0,16> = .PLACEMENT;
165 1154 4 MAP_POINTER = .MAP_POINTER + 2;
166 1155 3 END;
167 1156 3
168 1157 3 MAP_POINTER[FM2$V_FORMAT] = FM2$C_FORMAT1;
169 1158 3 MAP_POINTER[FM2$B_COUNT1] = .COUNT - 1;
170 1159 3 MAP_POINTER[FM2$V_HIGHLBN] = .LBN<16,6>;
171 1160 3 MAP_POINTER[FM2$W_LOWLBN] = .LBN<0,16>;
172 1161 3 MAP_POINTER = .MAP_POINTER + 4;
173 1162 3 END
174 1163 3
175 1164 2 ELSE
176 1165 3 BEGIN
177 1166 3 POINTER_SIZE = .POINTER_SIZE + 1;
178 1167 3 IF .COUNT LEQU 16384
179 1168 3 THEN
180 1169 4 BEGIN
181 1170 4 IF NOT CHECK_POINTER (.POINTER_SIZE) THEN RETURN 0;
182 1171 4 IF .PLACEMENT NEQ 0
183 1172 4 THEN
184 1173 5 BEGIN
185 1174 5 (.MAP_POINTER)<0,16> = .PLACEMENT;
186 1175 5 MAP_POINTER = .MAP_POINTER + 2;
187 1176 4 END;
188 1177 4
189 1178 4 MAP_POINTER[FM2$V_FORMAT] = FM2$C_FORMAT2;
190 1179 4 MAP_POINTER[FM2$V_COUNT2] = .COUNT - 1;
191 1180 4 MAP_POINTER[FM2$L_LBN2] = .LBN;
192 1181 4 MAP_POINTER = .MAP_POINTER + 6;
193 1182 4 END
```

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194      1183 4
195      1184 3 ELSE
196      1185 4 BEGIN
197      1186 4 POINTER_SIZE = .POINTER_SIZE + 1;
198      1187 4 IF .COUNT LEQU 1^30
199      1188 4 THEN
200      1189 5 BEGIN
201      1190 5 IF NOT CHECK_POINTER (.POINTER_SIZE) THEN RETURN 0;
202      1191 5 IF .PLACEMENT NEQ 0
203      1192 5 THEN
204      1193 6 BEGIN
205      1194 6   (.MAP_POINTER)<0,16> = .PLACEMENT;
206      1195 6   MAP_POINTER = .MAP_POINTER + 2;
207      1196 5 END;
208      1197 5
209      1198 5   .MAP_POINTER = ROT (.COUNT-1, 16);
210      1199 5   MAP_POINTER[FM2$V_FORMAT] = FM2$C_FORMAT3;
211      1200 5   MAP_POINTER[FM2$L_LBN3] = .LBN;
212      1201 5   MAP_POINTER = .MAP_POINTER + 8;
213      1202 5 END
214      1203 5
215      1204 4 ELSE BUG_CHECK (PTRCNT, FATAL, 'ACP block count exceeds retrieval pointer size');
216      1205 3 END;
217      1206 2 END;
218      1207 2
219      1208 2 RETURN 1;
220      1209 2
221      1210 1 END;

```

! end of routine MAKE_POINTER

			.TITLE	MAKPTR	
			.IDENT	\V04-000\	
			.EXTRN	BUGS_MAPCNTZER, BUGS_PTRCNT	
			.PSECT	\$CODE\$,NOWRT,2	
			.ENTRY	MAKE_POINTER, Save R2,R3,R4,R8	: 1069
		54 0000V 011C 00000	MOVAB	CHECK_POINTER, R4	
		04 00002	TSTL	COUNT	: 1125
		04 AC D5 00007	BNEQ	1\$	
		04 12 0000A	BUGW		: 1126
		FEFF 0000C			
		0000* 0000E	.WORD	<BUGS_MAPCNTZER!4>	
		52 D4 00010 1\$:	CLRL	PLACEMENT	: 1130
		02 D0 00012	MOVL	#2, POINTER_SIZE	: 1131
		6C 91 00015	CMPB	(AP), #4	: 1132
		08 1F 00018	BLSSU	2\$	
		52 10 AC D0 0001A	MOVL	PLACEMENT_CODE, PLACEMENT	: 1135
		02 13 0001E	BEQL	2\$: 1136
		53 D6 00020	INCL	POINTER_SIZE	: 1137
		0C AC D0 00022 2\$:	MOVL	FILE HEADER, HEADER	: 1144
		04 AC D1 00026	CMPL	COUNT, #256	: 1146
		2F 1A 0002E	BGTRU	4\$	
		00000100 8F 08 AC D1 00030	CMPL	LBN, #4194304	
		25 1E 00038	BGEQU	4\$	
		53 DD 0003A	PUSHL	POINTER_SIZE	: 1149
		01 FB 0003C	CALLS	#1, CHECK_POINTER	

			62	50 E9 0003F	BLBC	R0, 7\$	
				52 D5 00042	TSTL	PLACEMENT	1150
				03 15 00044	BEQL	3\$	
69	02	89	0E	52 B0 00046	MOVW	PLACEMENT, (MAP_POINTER)+	1153
89	89	04	AC	01 F0 00049	INSV	#1, #14, #2, (MAP_POINTER)	1157
	06		00	01 83 0004E	SUBB3	#1, COUNT, (MAP_POINTER)+	1158
			89	AC F0 00053	INSV	LBN+2, #0, #6, (MAP_POINTER)+	1159
			08	AC B0 00059	MOVW	LBN, (MAP_POINTER)+	1160
				67 11 0005D	BRB	10\$	1146
				53 D6 0005F	INCL	POINTER SIZE	1166
				AC D1 00061	CMPL	COUNT, #16384	1167
				28 1A 00069	BGTRU	6\$	
				53 DD 0006B	PUSHL	POINTER SIZE	1170
				01 FB 0006D	CALLS	#1, CHECK_POINTER	
				50 E9 00070	BLBC	R0, 11\$	
				52 D5 00073	TSTL	PLACEMENT	1171
				03 13 00075	BEQL	5\$	
69	02	89	50	52 B0 00077	MOVW	PLACEMENT, (MAP_POINTER)+	1174
89	50	04	OE	02 F0 0007A	INSV	#2, #14, #2, (MAP_POINTER)	1178
	0E		04	01 C3 0007F	SUBL3	#1, COUNT, R0	1179
			00	50 F0 00084	INSV	R0, #0, #14, (MAP_POINTER)+	
			01	AC D0 00089	MOVL	LBN, 1(MAP_POINTER)	1180
			A9	05 C0 0008E	ADDL2	#5 MAP_POINTER	1181
			59	33 11 00091	BRB	10\$	1167
				53 D6 00093	INCL	POINTER SIZE	1186
				AC D1 00095	CMPL	COUNT, #1073741824	1187
				23 1A 0009D	BGTRU	9\$	
				53 DD 0009F	PUSHL	POINTER SIZE	1190
				01 FB 000A1	CALLS	#1, CHECK_POINTER	
				23 50 E9 000A4	BLBC	R0, 11\$	
				52 D5 000A7	TSTL	PLACEMENT	1191
				03 13 000A9	BEQL	8\$	
50	50	04	89	52 B0 000AB	MOVW	PLACEMENT, (MAP_POINTER)+	1194
89	FD	AC	04	01 C3 000AE	SUBL3	#1, COUNT, R0	1198
			50	10 9C 000B3	ROTL	#16, R0, (MAP_POINTER)+	
			A9	8F 88 000B7	BISB2	#192, -3(MAP_POINTER)	1199
			89	AC D0 000BC	MOVL	LBN, (MAP_POINTER)+	1200
				04 11 000C0	BRB	10\$	1187
				FEFF 000C2	BUGW		1204
				0000* 000C4	.WORD	<BUGS_PTRCNT!4>	
				01 D0 000C6	MOVL	#1, R0	1208
				04 000C9	RET		
				50 D4 000CA	CLRL		
				04 000CC	RET	R0	1210

; Routine Size: 205 bytes, Routine Base: \$CODE\$ + 0000

```
223 1 ROUTINE CHECK_POINTER (SIZE) : L_CHECK_POINTER -
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270 1 ++
1213 1 FUNCTIONAL DESCRIPTION:
1214 1
1215 1 This routine determines whether a map pointer of the given size
1216 1 will fit in the file header.
1217 1
1218 1
1219 1
1220 1
1221 1 CALLING SEQUENCE:
1222 1     CHECK_POINTER (ARG1)
1223 1 INPUT PARAMETERS:
1224 1     ARG1: map pointer size in words
1225 1
1226 1 IMPLICIT INPUTS:
1227 1     R8: address of file header
1228 1
1229 1 OUTPUT PARAMETERS:
1230 1     NONE
1231 1
1232 1 IMPLICIT OUTPUTS:
1233 1     NONE
1234 1
1235 1 ROUTINE VALUE:
1236 1     1 if pointer fits
1237 1     0 if not
1238 1
1239 1 SIDE EFFECTS:
1240 1     header map in use count updated if pointer fits
1241 1
1242 1 --
1243 1
1244 2 BEGIN
1245 2
1246 2 EXTEP' AL REGISTER
1247 2     HEADER      = 8 : REF BBLOCK; ! file header address
1248 2
1249 2 IF .HEADER[FH2$B_MAP_INUSE] + .SIZE GTRU
1250 2     .HEADER[FH2$B_ACOFFSET] - .HEADER[FH2$B_MPOFFSET]
1251 2 THEN RETURN 0;
1252 2
1253 2 .HEADER[FH2$B_MAP_INUSE] = .HEADER[FH2$B_MAP_INUSE] + .SIZE;
1254 2
1255 2
1256 2 RETURN 1;
1257 2
1258 1 END;
1259 1
1260 1
1261 1
1262 1
1263 1
1264 1
1265 1
1266 1
1267 1
1268 1
1269 1
1270 1
```

0004 00000 CHECK_POINTER:

51	3A	A8	9A	00002	.WORD	Save R2
51	04	AC	C0	00006	MOVZBL	58(HEADER), R1
					ADDL2	SIZE, R1

: 1211
: 1250

50	02	A8	9A	0000A	MOVZBL	2(HEADER), R0	: 1251
52	01	A8	9A	0000E	MOVZBL	1(HEADER), R2	:
50		52	C2	00012	SUBL2	R2, R0	:
50		51	D1	00015	CMPL	R1, R0	:
		09	1A	00018	BGTRU	1\$	
3A	A8	04	AC	80 0001A	ADDB2	SIZE, 58(HEADER)	: 1254
		50	01	00 0001F	MOVL	#1, R0	: 1256
			04	00022	RET		
		50	D4	00023 18:	CLRL	R0	: 1258
			04	00025	RET		

; Routine Size: 38 bytes, Routine Base: \$CODE\$ + 00CD

; 271 1259 1
; 272 1260 1 END
; 273 1261 0 ELUDOM

PSECT SUMMARY

Name	Bytes	Attributes
\$CODE\$	243	NOVEC,NOWRT, RD, EXE,NOSHR, LCL, REL, CON,NOPIC,ALIGN(2)

Library Statistics

File	-----	Symbols	-----	Pages	Processing
	Total	Loaded	Percent	Mapped	Time
_S255\$DUA28:[SYSLIB]LIB.L32;1	18619	30	0	1000	00:01.9

COMMAND QUALIFIERS

BLISS/CHECK=(FIELD,INITIAL,OPTIMIZE)/LIS=LISS:MAKPTR/OBJ=OBJ\$:MAKPTR MSRC\$:MAKPTR/UPDATE=(ENH\$:MAKPTR)

Size: 243 code + 0 data bytes
 Run Time: 00:11.4
 Elapsed Time: 00:24.1
 Lines/CPU Min: 6636
 Lexemes/CPU-Min: 24226
 Memory Used: 154 pages
 Compilation Complete

0171 AH-BT13A-SE
VAX/VMS V4.0

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QUOTAUTIL
LIS

100ONE
LIS

LOCKON
LIS

MAPUBN
LIS

MODIFY
LIS

MOUNT
LIS

NXTHDR
LIS

MAKNMB
LIS

MAKSTR
LIS